Georgia Performance Standards Framework for Earth Science – 6th Grade

Unit: Universe and Solar System

Sternberg Task

Planets

Subject Area: Earth Science

Grade: 6th

Standards (Content and Characteristics):

S6E1 Students will explore current scientific views of the universe and how those views evolved.

c. Compare and contrast the planets in terms of
   • size relative to the earth
   • surface and atmospheric features
   • relative distance from the sun
   • ability to support life.

S6CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

   a. Understand the importance of—and keep—honest, clear, and accurate records in science.
   b. Understand that hypotheses are valuable if they lead to fruitful investigations, even if the hypotheses turn out not to be completely accurate descriptions.

S6CS2. Students will use standard safety practices for all classroom laboratory and field investigations.

   a. Follow correct procedures for use of scientific apparatus.
   b. Demonstrate appropriate techniques in all laboratory situations.
   c. Follow correct protocol for identifying and reporting safety problems and violations.

S6CS6. Students will communicate scientific ideas and activities clearly.

   a. Write clear, step-by-step instructions for conducting scientific investigations, operating a piece of equipment, or following a procedure.
   c. Organize scientific information using appropriate tables, charts, and graphs, and identify relationships they reveal.
Georgia Performance Standards Framework for Earth Science – 6th Grade

S6CS9. **Students will investigate the features of the process of scientific inquiry.**
Students will apply the following to inquiry learning practices:
  a. Scientific investigations are conducted for different reasons. They usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations.
  c. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator’s credibility with other scientists and society.

S6CS10. **Students will enhance reading in all curriculum areas by:**
  a. Reading in All Curriculum Areas
  * Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas
  * Read both informational and fictional texts in a variety of genres and modes of discourse
  * Read technical texts related to various subject areas
  c. Building vocabulary knowledge
  * Demonstrate an understanding of contextual vocabulary in various subjects.
  * Use content vocabulary in writing and speaking.
  * Explore understanding of new words found in subject area texts.
  d. Establishing context
  * Explore life experiences related to subject area content.
  * Discuss in both writing and speaking how certain words are subject area related.
  * Determine strategies for finding content and contextual meaning for unknown words.

**Enduring Understanding:**
  * The planets of our solar system differ in size, composition (rock or gas), surface and atmospheric features, and distance from the sun. Planets move around the sun in nearly circular orbits.
  * The Earth is the only body in the solar system that appears to be able to support life.

**Essential Question(s):**
How does the Earth differ from the other planets?

**Pre-Assessment:**
Students will take a video quiz on the solar system before watching the actual video. Students will retake the quiz after watching the video (see resources).
## Georgia Performance Standards Framework for Earth Science – 6th Grade

<table>
<thead>
<tr>
<th>Outcome/Performance Expectation</th>
<th>ANALYTICAL</th>
<th>PRACTICAL</th>
<th>CREATIVE</th>
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</thead>
<tbody>
<tr>
<td>• Students will compare and contrast the planets of our solar system regarding size, surface and atmospheric features, distance from the sun and orbits. • Based on their research, students will conclude that the Earth appears to be the only planet that supports life.</td>
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### Performance Task:
(Detailed Description)

**Teacher role?**

**Teacher: Collaborate with math teacher regarding ratios and proportions before assigning this task**

1. Show video summarizing information of our solar system (check resources).
2. Make up a chart for students to collect data on all the planets of our solar system (Figure 1 and Figure 2).
3. Provide a list of websites for students to explore each planet (check resources).
4. Remind students that Pluto is now classified as a dwarf planet.

**Teacher: Collaborate with math teacher regarding ratios and proportions before assigning this task**

1. Show video summarizing information of our solar system (check resources). This will help students choose the planets they would like to investigate further.
2. Make up a chart for students to collect data on either the inner or outer planets. Let students choose their preference. (Figure 1 and Figure 2).
3. Provide a list of websites for students to explore each planet (check resources).
4. Remind students that Pluto is now classified as a dwarf planet.

**Teacher: Collaborate with math teacher regarding ratios and proportions before assigning this task**

1. Show video summarizing information of our solar system (check resources).
2. Provide a list of websites for students to explore each planet (check resources).
3. Review ratios and proportions with students and explain how they should make up a model of the solar system.
4. Remind students that Pluto is now classified as a dwarf planet.
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<thead>
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<tbody>
<tr>
<td></td>
<td>1. Bookmark specific websites students can use when doing research.</td>
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<td>2. Students should complete documentation on appropriate internet use as directed by the school system.</td>
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<td>3. Preview videos prior to showing to students.</td>
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<td>3. Preview videos prior to showing to students.</td>
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**Student**

1. Visit the listed websites to gather information about the planets.
2. Make up a visual to display your information (poster, three-dimensional display, or other visual of your choice). Check with your teacher before working on your display.

1. Choose the chart of your preference to investigate either the inner or outer planets. Let your teacher know which set of planets you will use.
2. Choose one of the planets in your chart to investigate a little further. Let your teacher know which planet you chose.
3. Make up a visual that shows your planet and some of its features. The visual must be labeled and detailed enough to teach other students about that planet.

1. Gather information from the analytical group or from the provided websites on the sizes of the sun and planets and the distances from the Sun.
2. Add to your chart, the rotation and revolution periods for each planet (Figure 3).
3. Create a three-dimensional model of the solar system using a scale of your choice. Check with your teacher to verify that your scale and proportions are correct before starting your model.
### Resources

- “Space Exploration: Our Solar System,”
- “The Solar System: Above and Beyond,”


[http://dept.physics.upenn.edu/nineplanets/](http://dept.physics.upenn.edu/nineplanets/)


### Homework/Extension
Describe the solar system structure and mention two characteristics of each planet.

**Writing Prompt:**
You live on the planet that you chose to investigate. Write a letter to a close friend who lives on earth describing the features of your planet and how different your life is from life on earth.

**Explain the relationship between distance from the sun and period of revolution.**
If several asteroids should come together and form a new planet, where would that planet be located and approximately how long would the period of revolution be? Support your answer using the information you obtained on the solar system.

### Instructional Tasks Accommodations for ELL Students
- seat students near the teacher or positive role models
- organize the types of facts students should be finding about their planets in the form of a graphic organizer (size relative to the earth, surface and atmospheric features, relative distance from the sun, ability to support life)
- have students do think-pair-share to identify prior knowledge
- relate content to real life
- adjust teacher talk to increase comprehensibility
# Instructional Tasks

## Accommodations for Students with Disabilities
- Provide a checklist with each step in the assignment enumerated to assist students with organization.
- Minimize distractions and provide quiet place or study carrel.
- Refrain from speaking with back turned to students to accommodate DHH students and others with language/communication disabilities.
- Allow students to dictate their original letter in the extension assignment to a peer partner or let them use a data collecting instrument.
- Use a K-W-L exercise to help students connect background information with what they are trying to learn/discover.

## Accommodations for Gifted Students
- Create a learning environment that encourages creativity/discovery through the use of literature and reference materials.
- Create an environment where ideas are accepted without being evaluated; where risk-taking is encouraged.
- Supply reading material on a wide variety of subjects and levels.
- Encourage students to use resource materials to gather a depth of information about the history and use of the Hubble Space Telescope.
- As students extend this lesson have them keep a Space-log at home; encourage them to observe the night sky for 10-15 minutes every night and record their observations.
FIGURE 1. FACTS ABOUT OUR PLANETS (ANALYTICAL & PRACTICAL)

<table>
<thead>
<tr>
<th>INNER PLANETS</th>
<th>DIAMETER (km) &amp; Size Compared to Earth</th>
<th>Distance from Sun (AU*)</th>
<th>SURFACE FEATURES</th>
<th>ATMOSPHERE</th>
<th>NUMBER OF MOONS</th>
<th>ABILITY TO SUPPORT LIFE YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st from Sun</td>
<td>___________ km</td>
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<td></td>
<td>x Earth</td>
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<td>2nd from Sun</td>
<td>___________ km</td>
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<td></td>
<td>x Earth</td>
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<td>3rd from Sun</td>
<td>___________ km</td>
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<td></td>
<td>x Earth</td>
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<tr>
<td>4th from Sun</td>
<td>___________ km</td>
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<td>x Earth</td>
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</table>

*AU = Astronomical Unit, approximately 1.50 million kilometers. (Earth = 1 AU from the sun)
### FIGURE 2. FACTS ABOUT OUR PLANETS (ANALYTICAL & PRACTICAL)

<table>
<thead>
<tr>
<th>OUTER PLANETS</th>
<th>DIAMETER (km) &amp; Size Compared to Earth</th>
<th>Distance from Sun (AU*)</th>
<th>SURFACE FEATURES</th>
<th>ATMOSPHERE</th>
<th>NUMBER OF MOONS</th>
<th>ABILITY TO SUPPORT LIFE YES/NO</th>
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<tbody>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; from Sun</td>
<td>___________ km</td>
<td>___________</td>
<td>x Earth</td>
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<td>6&lt;sup&gt;th&lt;/sup&gt; from Sun</td>
<td>___________ km</td>
<td>___________</td>
<td>x Earth</td>
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<td>7&lt;sup&gt;th&lt;/sup&gt; from Sun</td>
<td>___________ km</td>
<td>___________</td>
<td>x Earth</td>
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<td>8&lt;sup&gt;th&lt;/sup&gt; from Sun</td>
<td>___________ km</td>
<td>___________</td>
<td>x Earth</td>
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<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt; from Sun</td>
<td>___________ km</td>
<td>___________</td>
<td>x Earth</td>
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# Georgia Performance Standards Framework for Earth Science – 6th Grade

## FIGURE 3. SOLAR SYSTEM INFORMATION (CREATIVE)

<table>
<thead>
<tr>
<th>THE SUN AND NINE PLANETS</th>
<th>Size Compared to Earth</th>
<th>Distance from Sun (AU*)</th>
<th>PERIOD OF ROTATION</th>
<th>PERIOD OF REVOLUTION</th>
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<tbody>
<tr>
<td>SUN</td>
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